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File No. 691-05
February, 2007)

Warner Springs Estates LLC
1037 Didrickson Way
Laguna Beach, California
92651

Attn: Mr. Bob Earl

Subject: The Highlands at Warner Springs
(TM 5450)
Warner Springs area,
San Diego County, California
GEOLOGIC INVESTIGATION

Dear Mr. Earl:

In accordance with our agreement, I have completed a geologic investigation of The Highlands at Warner Springs. The results of the investigation indicate the site is traversed by two northeast to east trending fault zones. It is concluded on the basis of the investigation and the results of additional petrographic analysis included in the appendix that faulting is no younger than Late Pleistocene in age. Since the faults have been determined to have not been active during the Holocene (last 11,000yrs) it is concluded they do not represent a ground rupture hazard and structural setbacks are not recommended.

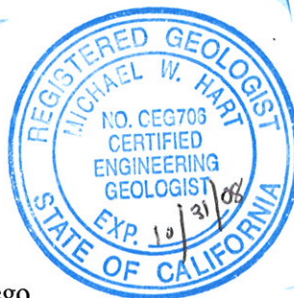
The site is underlain by granitic rocks of the Peninsular Range Batholith that here consist of generally highly weathered tonalite. Major drainages on the site contain loose alluvium varying in thickness from a few feet to over 16 feet in the central valley. If you have any questions regarding this report or geologic aspects of the property, please contact the undersigned.

Very truly yours,



Michael W. Hart
CEG 706

3cc Jim Bennett, Geologist, County of San Diego
3cc John Peterson, Peterson Environmental Services



GEOLOGIC INVESTIGATION THE HIGHLANDS AT WARNER SPRINGS SAN DIEGO COUNTY, CALIFORNIA

INTRODUCTION

This report presents the results of a geologic investigation of a proposed residential subdivision located in the Warner Springs area of San Diego County, California (Figure 1). More specifically the site is located along the east and west sides of Los Coyotes Road south of the intersection with Camino Ortega. The property is situated within a wide zone of northwest trending active faulting that includes the Elsinore fault and several lesser known parallel faults making up the eastern edge of the zone. Mapping by Jahns (1954) indicated the north branch of the Aguanga fault traversed the eastern portion of the site. Accordingly, the primary purpose of this study was to determine if this or other faults are present on site, and if so, what potential effect they could have on the proposed development. In addition, the general geologic characteristics of the site and other potential geologic hazards that may be present were to be addressed.

FIELD WORK

In order to determine if faulting is present beneath the site, five exploratory trenches varying in length from 85 feet to 260 feet were excavated with a backhoe along strong topographic and vegetation lineaments located in the central and northern portions of the site. The trenches varied in depth from approximately 6 to 15 feet depending on conditions encountered during the excavation. After careful cleaning of the trench walls, they were logged at a scale of 1" = 5'. Logs of trenches are included as Plates 2 through 4a (see pocket).

SITE AND PROPOSED PROJECT DESCRIPTION

The property to be developed consists of approximately 150 acres of undeveloped land located on the east and west sides of Los Coyotes Road south of Warner Springs, San Diego County,

California. Elevations on the site vary from approximately 3,700 feet in the southeastern portion of the property to 3300 feet near the northwest property corner. The southern portion of the property is characterized topographically by a series of low ridges and valleys that drain to the west. The northern portion of the site is dominated by moderate west to north-facing slopes separated by a deeply dissected topographic bench. Vegetation consists locally of mature oak trees concentrated primarily in the northern portion of the property and heavy growth of chaparral consisting of manzanita, Red Shank, and other smaller woody shrubs.

It is proposed to subdivide the property into 28 residential lots each a minimum of 5 acres. Each lot will be serviced by individual wells and septic systems and will have a small graded building pad.

GENERAL GEOLOGY AND GEOLOGIC SETTING

The site is located along the eastern edge of the Warner Basin in the northern part of the Peninsular Ranges of eastern San Diego County, California. The site is underlain by granitic rocks consisting chiefly of Tonalite (Jahns, 1954) with localized areas underlain by shallow surficial deposits of colluvium and alluvium in the major drainages. The Warner Basin formed along several strands of the Elsinore fault and related minor faults located east of the principal active faults in the region. Reference to mapping by Jahns (1954) and Magistrale and Rockwell (1996) indicates the site lies along the trace of the north branch of the Aguanga fault, discussed in more detail under the heading **Local Faulting** and just east of the Agua Tibia/Earthquake Valley fault. These two faults according to Magistrale and Rockwell (1996) represent the eastern strand of a section of the Elsinore fault that consists in this area of a double strand along which total slip along the fault zone has been distributed at varying rates through time.

Quaternary Alluvium and Surficial Soils

Most of the minor and principal drainages on the property contain stream deposited alluvium consisted of generally dry to moist, very loose, coarse sands and silty sand. Alluvium in the central east-west trending valley in which Trenches 1 and 2 are located contains alluvium in excess of 16 feet thick. The deeper deposits of alluvium exposed in Trenches 1 and 2 contain bedded detrital charcoal resulting from mid Holocene wildfires. Samples of the charcoal from Trench 2 were submitted to Beta Analytic Laboratories for radiocarbon dating.

Surficial soils consisting of relatively young, probably Holocene, colluvium and topsoils exist over most of the site. Topsoils are generally poorly developed over most of the higher exposed areas of the site. A horizon soils consisting of organic silty sands underlain by discontinuous and poorly to moderately developed argillic B horizons are present locally on some steeper northwest facing slopes. B horizon soils are also intermittently preserved beneath deeper alluvium in the central valley.

Local Faulting:

The site lies within a broad zone of active faulting related to the northwest trending Elsinore fault. The primary references utilized in determining the site's relationship and location to known or previously mapped faults were Weber (1963) Jahns, (1954), Rogers (1965), and Magistrale and Rockwell (1996). The regional fault maps (Weber, 1963; Rogers, 1965) referenced Jahns (1954) as the origin of the fault locations depicted on their maps. Magistrale and Rockwell's 1996 study did not include any original fault mapping and addressed the slip rates and seismicity of the central and southern Elsinore fault zone. Their report discussed in detail the nature and degree of activity of the Elsinore fault and Agua Tibia/Earthquake Valley faults in the vicinity of the site. They concluded that Elsinore fault is double stranded in the central portion of the zone and represented by the Elsinore fault proper west of Lake Henshaw and the Agua Tibia/Earthquake Valley faults that lie offsite to the southwest (Figure 2).

The only previously mapped fault depicted as being located on or adjacent to the site is the north branch of the Aguanga fault as mapped by Jahns (1954). According to his map, the northwest trending fault lies partially within the eastern property line. Geologic mapping for this report including a detailed study of stereographic pairs of aerial photographs (U.S.D.A., 1953, San Diego County, 1978/79) indicates the presence of the Aguanga fault on site is not likely. Aerial photographs reveal the presence of very strong topographic and vegetation lineaments trending in an east-west and northeast direction through the site but no lineaments that could be correlated with the northwest trending Aguanga fault. Additional evidence that the Aguanga fault is not present as mapped is the observation that the strong east-west trending lineament formed by the Central Valley is not displaced by faulting.

It is concluded on this basis, as well as the lack of field evidence of northwest trending faulting, that the Aguanga fault as mapped by Jahns (1954) does not exist on site and likely does not

extend as far south as previously mapped. Subtle northwesterly lineaments observed on the San Diego County 1978/79 aerial photographs suggest the fault dies out to the north before reaching the vicinity of the site (Figure 3a). Slip on the fault is likely transferred to the south branch of the fault located approximately 1.5 miles to the west or the Agua Tibia fault located 3 miles west (Figures 1 and 2).

Although there is no evidence that the Aguanga fault is located on or near the site, the review of aerial photographs indicated the presence of very strong east-west to northeast topographic and vegetation lineaments. These lineaments were investigated by trenching and discussed in the following paragraphs.

RESULTS OF TRENCHING

Five fault location trenches were excavated in the locations shown on the Geologic and Fault Map (Plate 1). The trenches were located in areas that would provide information relating to the relative age of faulting and origin of the lineaments. Trenches 1, 1A, and 2 were located along the Central Valley Lineament east of Los Coyotes Road. The mouth of the central valley extends beyond the limits of the site to the east and west. In both directions there are strong vegetation alignments as well as the linear nature of the valley itself that strongly suggest the presence of faulting. Trench 3 was located along the trend of a northeast oriented lineament representing a possible fault that may have displaced another east-west fault (Fault F-1). Trench 4 was located west of Los Coyotes Road perpendicular to the east-west set of sub-parallel lineaments representing the F-1 fault zone.

Trench 1: Trench 1 was approximately 85 feet in length and is located on the north side of the Central Valley near the east property line (This trench was extended as Trench 1A during the preparation of the Appendix included at the back of this report for a total length of approximately 185 feet). Trench 1 trench encountered several east to northeast trending, south-dipping, normal faults located on trend with the most northerly of two parallel lineaments observed in the eastern portion of the valley. The faults are manifested by well-developed clay gouge and shear surfaces along with locally developed thick zones of white thoroughly pulverized rock (rock flour). The faults do not offset topsoil or the thick alluvium located in the southern portion of the trench determined to have a radiocarbon age of 3970 yrs. by Beta Analytic Inc.(2006).

Trench 2: Trench 2 is located 360 feet west of Trench 1 to further define the location of the faults encountered in Trench 1 and to attempt to obtain datable material for determining the age of faulting. This trench was also 85 feet in length and encountered the same fault zone exposed in Trench 1. The most significant fault is located at Station 30 to 35 and is accompanied by 3 to 4 feet of pulverized rock bounded by two northeast trending, south-dipping fault planes. The fault zone is overlain by an unfaulted detrital charcoal layer correlated with a similar charcoal layer present in T1 determined to have an age of approximately 3970 yrs.

Relatively minor faults, as judged from the thin clay gouge and lack of significant thickness of adjacent shearing, are located between Stations 55 to 80. These faults are overlain by a thin buried B-horizon preliminarily estimated to be early Holocene to Late Pleistocene in age based on the relative development of the soil.

Trench 3: One of the strong northeast trending lineaments is located near the northern property line and is formed by a pair of sub-parallel stands of oak trees. The lineament pair appears to be either offset by a more northerly trending fault or, alternatively, bends to the right in an “S” shaped curve. The unnamed fault that may offset the lineament pair is traceable north of the site as a moderately strong vegetation lineament across the alluviated valley occupied by Warner Springs and into the hills to the north. To the south of Trench 3 the lineament dies within a few hundred feet.

Trench 3 was approximately 252 feet in length and oriented in an east-west direction across the above described northeast lineament. Trench logging confirmed the presence of several low to high-angle, north to northeast trending faults consistent with the location of the lineament observed on the aerial photographs. The faults are characterized by poorly developed gouge zones, generally poorly developed shear planes, and in addition, lack the wide zone of shearing and pulverized rock observed along faults in Fault Zones 1 and 2. It is concluded, therefore, the fault is a minor fault that likely dies out within a few hundred feet south of the trench. Since the faults lack significant gouge and shear fabric and generally trend to the northeast as opposed to the northwesterly trend of the Aguanga fault, it is further concluded that this relatively minor fault system is not related to the Aguanga fault zone.

Trench 4: Trench 4 is located on the west side of Los Coyotes Road and perpendicular to the fault zone designated as Fault F-1 manifested by the set of sub-parallel vegetation lineaments and steep north-facing scarp discussed previously. In order to investigate both strands of the lineament, the trench was extended approximately 260 feet in length and varied from 4 to approximately 7 feet deep. The results of trenching indicated the presence of numerous low-angle, south-dipping minor faults. The faults are interpreted as low-angle thrust faults because they dip into the north-facing scarp separating the topographically high terrain on the south from the relatively low area to the north.

None of the faults in Trench 4 offset topsoil, however, the soils over most of the length of the trench are very thin and not well developed. The soil overlying the fault between Station 50 and 55 was somewhat thicker and better developed than in other portions of the trench and contained a moderately well-developed argillic horizon (see detail, Plate 5). The fault does not offset the relatively sharp contact between the weathered granitic rock and the argillic Bt horizon and has been determined by petrographic analysis to be no younger than Late Pleistocene in age. (See further discussion of this fault in the Appendix),.

GEOLOGIC HAZARDS AND SEISMICITY

Additional geologic hazards addressed for this report include the potential for ground shaking from local and regional active faults, landsliding, liquefaction, and seismically induced settlement. Each of these potential geologic hazards is discussed below.

Regional Faulting and Seismicity:

The site will be affected by seismic shaking as a result of earthquakes on major local and regional active faults located throughout the southern California area. The site lies 7.4 miles and 2.5 miles, respectively from the Elsinore and Agua Tibia faults, the closest active faults to the site (Magistrale and Rockwell, 1996). Other significant regional active faults whose activity could affect the site are summarized on Table I below.

**TABLE I: DETERMINISTIC SITE PARAMETERS
for SELECTED FAULTS**

FAULT	DISTANCE (mi.)	MAX. PROB. MAGNITUDE.	PEAK SITE ACC. (g)
Elsinore/Agua Tibia	2.5	7.1	.60
San Jacinto	30	7.2	.08
San Andreas	54	7.3	.04
Rose Canyon	25	7.1	.08
Coronado Bank	39	7.4	.07

(attenuation relation (mean): Bozorgina and others, 1999)

Liquefaction and Seismically Induced Settlement:

At anticipated foundation depths, the proposed structures will be underlain by dense granitic bedrock or compacted fills. These soils are not considered susceptible to seismically induced liquefaction or settlement.

Landsliding:

Review of stereographic pairs of aerial photographs (San Diego County 1978/79 and U.S.D.A., 1953) and topographic maps (Scale 1" = 2000' and 1" = 200') indicates there is no geomorphic evidence to suggest the presence of ancient deep-seated landsliding on or adjacent to the site.

CONCLUSIONS AND RECOMMENDATIONS

1. It is concluded on the basis of evidence presented in the appendix of this report that none of the faults depicted on Plate I exhibit evidence of Holocene activity. Based on the petrographic evidence presented in the appendix, it is concluded that all faulting on the site, including relatively minor faults not examined petrographically, are likely contemporaneous with intrusion of pegmatite dikes during early to mid-Cretaceous time. It is also concluded the faults are not a constraint to development of the site and that structural setbacks are not required.

2. The fault investigated by Trench 3 (Lots 13 and 14) as well as the short fault segment extending from Lot 6 to the vicinity of Lot 16 are minor faults that either die out on site or are not visible as vegetation or topographic lineaments. Accordingly, it is concluded they have not likely been active during the Holocene and no structural setbacks are recommended.

3. The results of this investigation indicate there is no evidence of ancient deep-seated landsliding on the property. The site is characterized by gently to moderately sloping natural terrain wherein landsliding is not likely.

REFERENCES

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Jahns, R.H., 1954 Geologic guide for the northern part of the Peninsular Range Province, southern California; California Division Mines Bull. 170, Geologic Guide No. 5, 59 p.

Joyner, W.B. and Boore, D.M. 1982, Prediction of earthquake response spectra, U.S. Geological Survey Open File Report 82-977, 16pp.

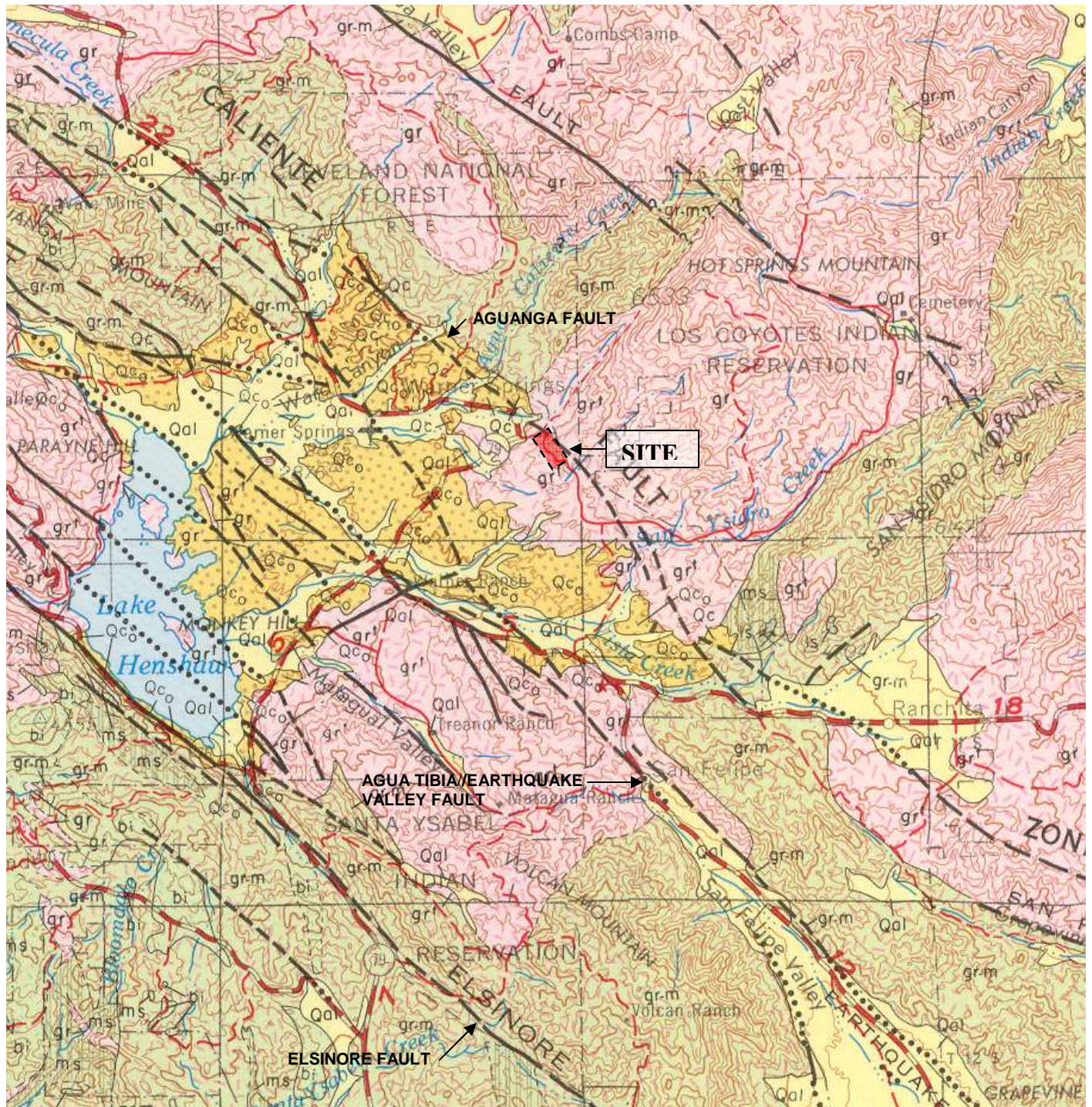
Magistrale, H., and Rockwell, T., The central and southern Elsinore fault zone, Southern California, Bull. of Seismological Soc. of America, Vol. 86, No. 6, pp. 1793-1803

Lindvall, S.C., Rockwell, T.K., and Lindvall, C.E., 1990, The seismic hazard of San Diego revised: New evidence of Magnitude 6+ Holocene earthquakes on the Rose Canyon Fault Zone, in Proceedings of U.S. National Conference on Earthquake Engineering, Palm Springs, California, vol 1: Earthquake Engineering Research Inst., p. 679-688.

Rogers, T.H., 1965, Geologic Map of California, Santa Ana Sheet, California Div. Mines and Geology

Weber, F.H., 1963, Mines and mineral resources of San Diego county, California, County Rept. 3, California Div. Mines and Geology.

Aerial Photographs: San Diego County, 1978/79, 1N 19 & 20; U. S. D. A., 1953, AXN 7M, 137-139.



SITE LOCATION AND REGIONAL GEOLOGIC MAP, WARNER SPRINGS AREA, SAN DIEGO COUNTY, CALIFORNIA

(from Rogers, 1965, Geologic map of California, Santa Ana Sheet)

LEGEND

- Qal Alluvium
- Qco Pleistocene non-marine sediments
- gr^t Granitic rocks, tonalite and diorite
- gr-m Granitic and metamorphic rocks

six miles

Figure 1

GEOLOGY OF SOUTHERN CALIFORNIA

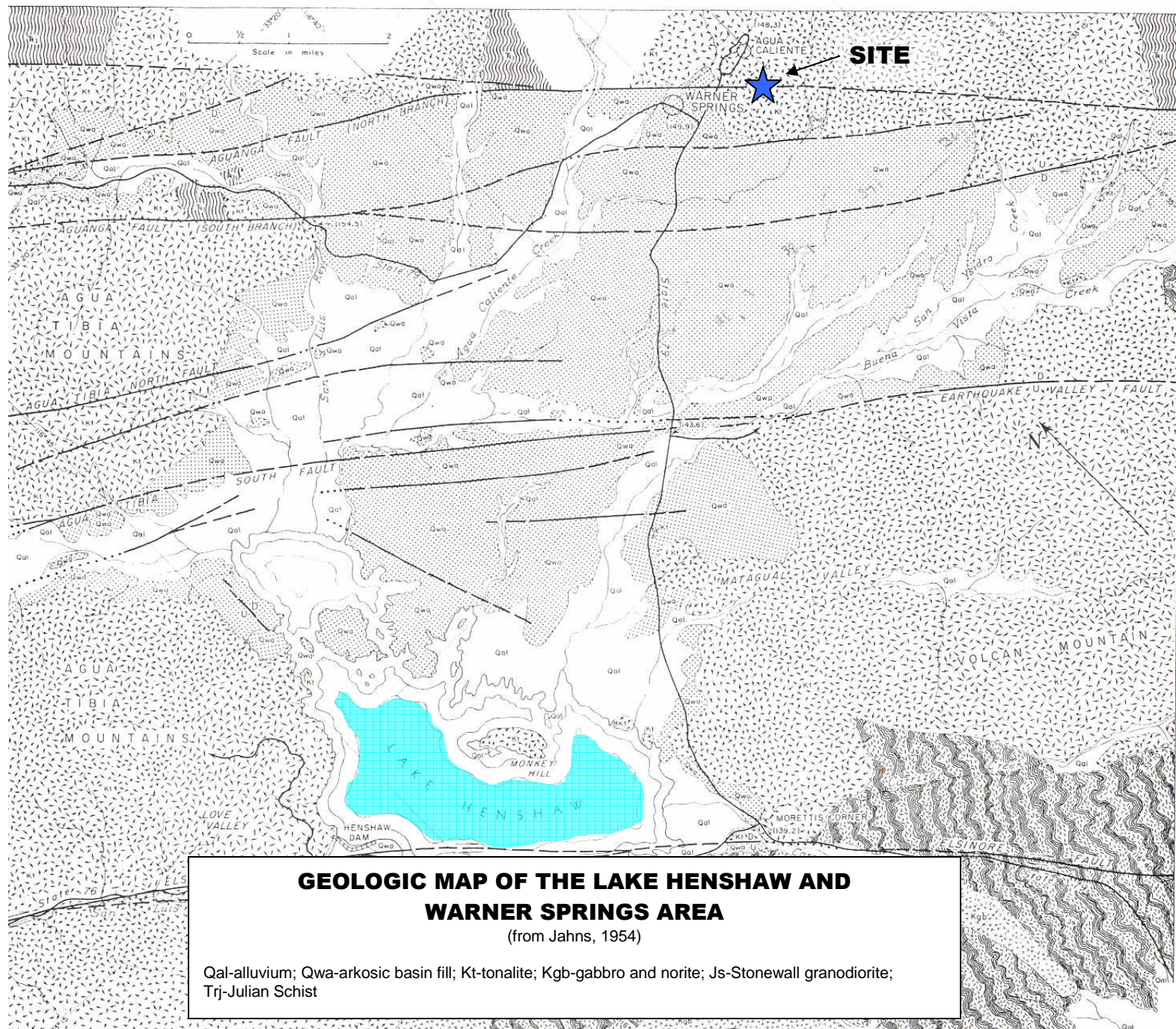


Figure 2



Figure 3. View to southeast showing major faults manifested by vegetation and topographic lineaments. F1; thrust fault complex; F2, central valley fault.

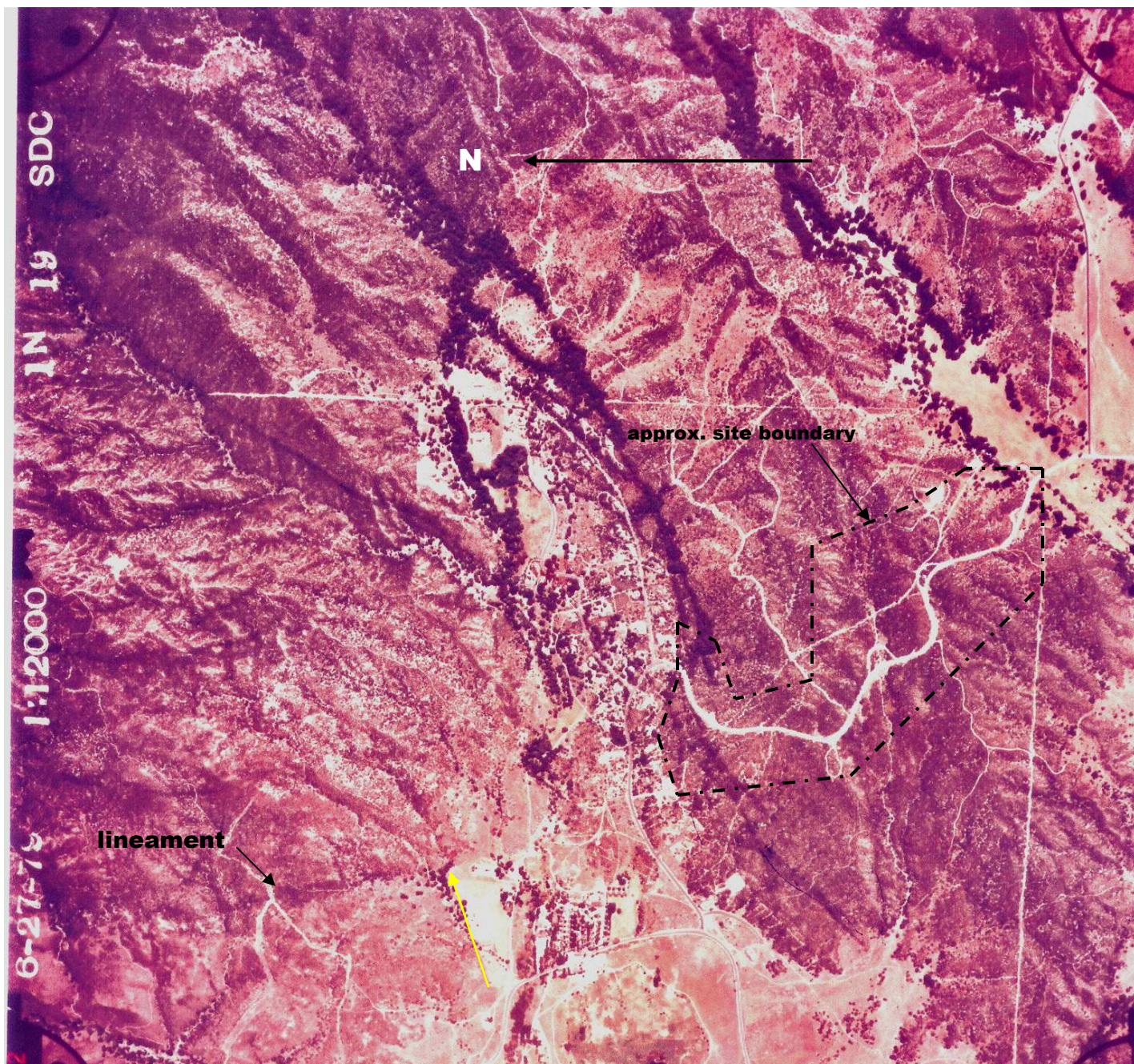
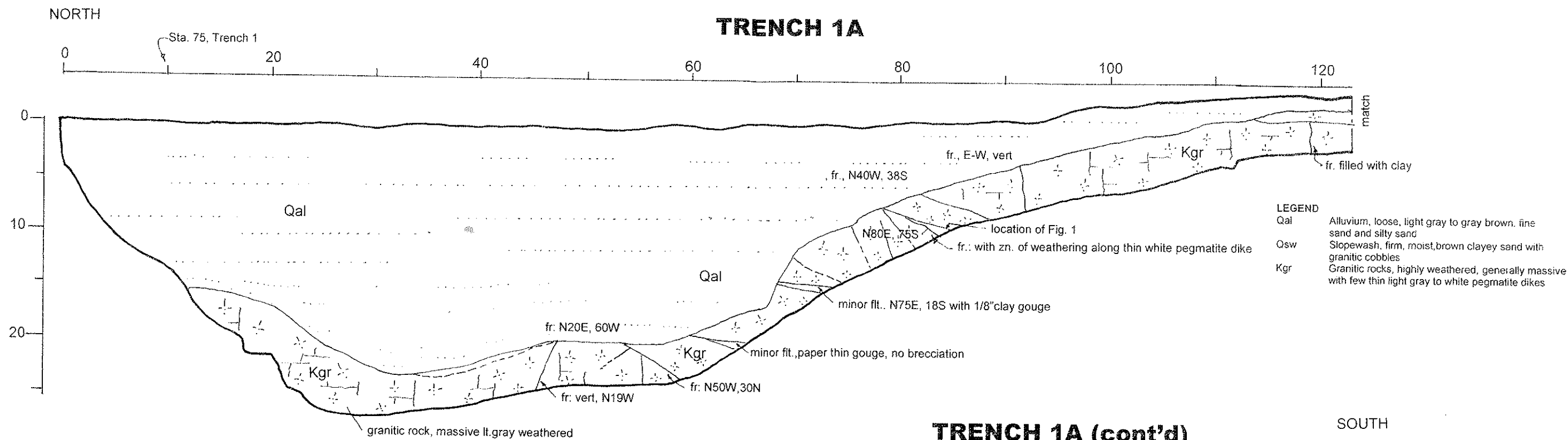
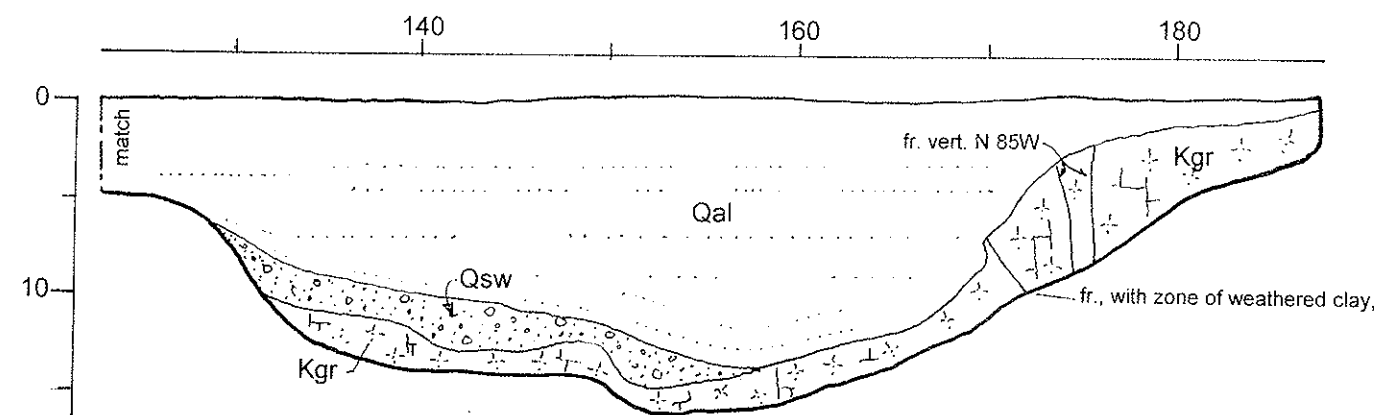


Figure 3a. Possible location of Aguanga fault north of site. Discontinuous vegetation lineament terminates at tip of the yellow arrow prior to reaching vicinity of site. (ref. photo: County of San Diego, 1978/79, Flt.1N, 19)

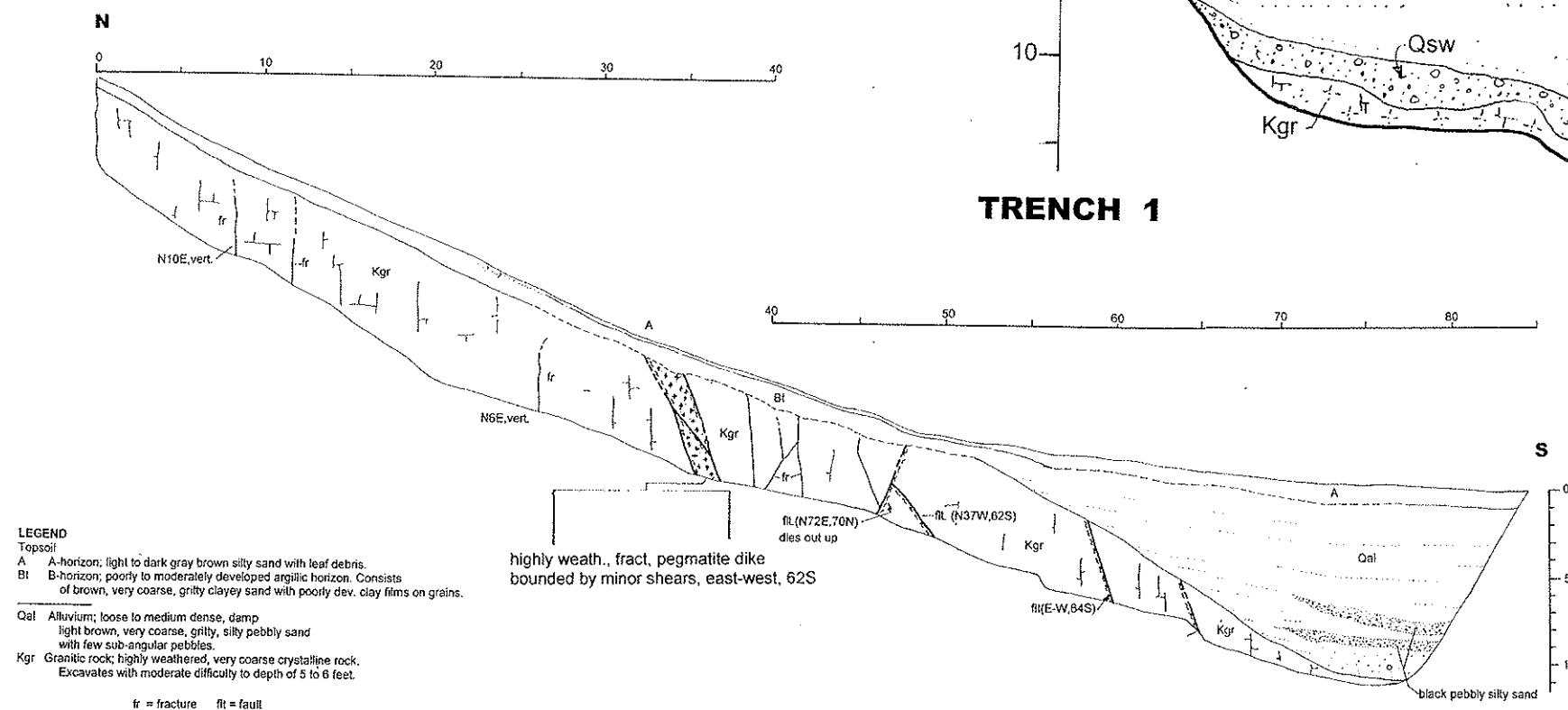


TRENCH 1A (cont'd)

SOUTH



TRENCH 1



TRENCH 1A WARNER SPRINGS ESTATES
Warner Springs Area, San Diego County, California

SCALE: 1" = 10'

APPROVED BY:

DRAWN BY

DATE: Jan. 2006

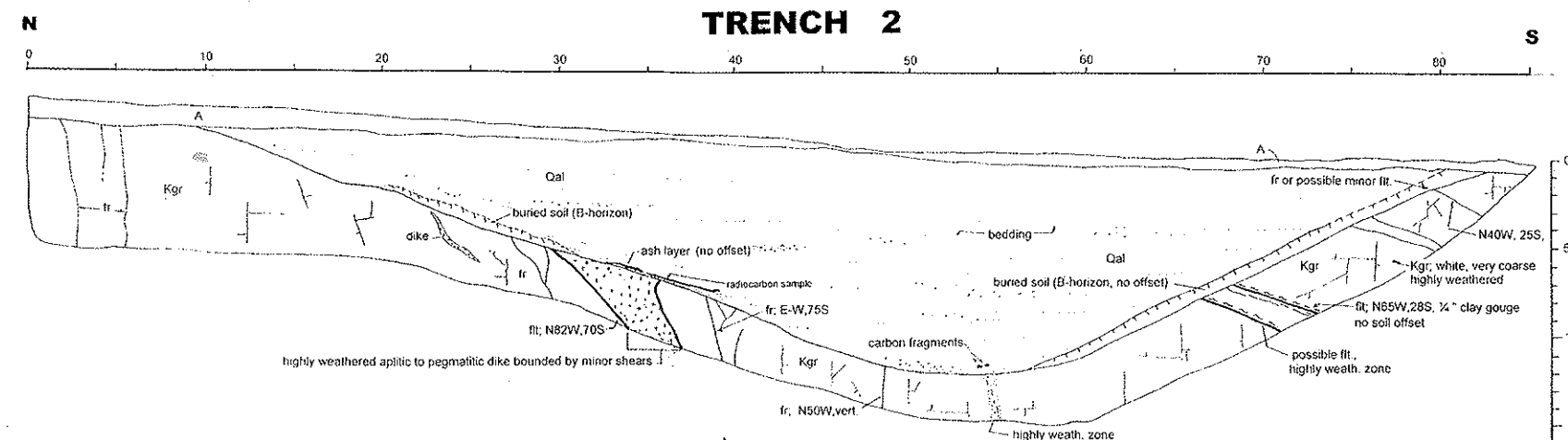
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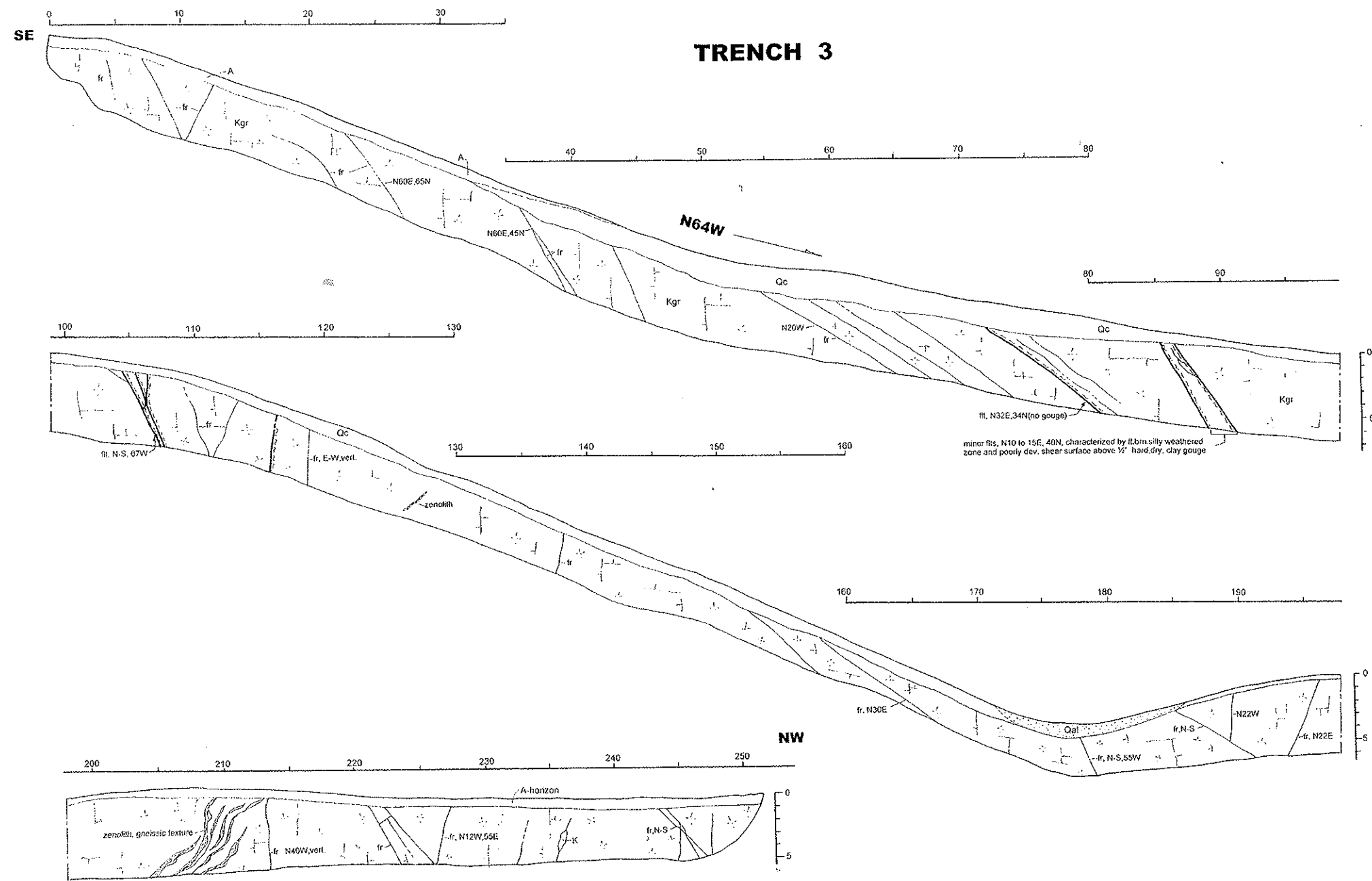
Plate 2



LEGEND
 Topsoil
 A A-horizon; light to dark gray brown silty sand with leaf debris.
 Bl B-horizon; poorly to moderately developed argillic horizon. Consists of brown, very coarse, gritty clayey sand to sandy clay with poorly dev. clay films on grains.
 Qal Alluvium; loose to medium dense, damp light brown, very coarse, gritty, silty pebbly sand with few sub-angular pebbles.
 Kgr Granitic rock; highly weathered, very coarse crystalline rock. Excavates with moderate difficulty to depth of 5 to 6 feet.
 fr = fracture ft = fault

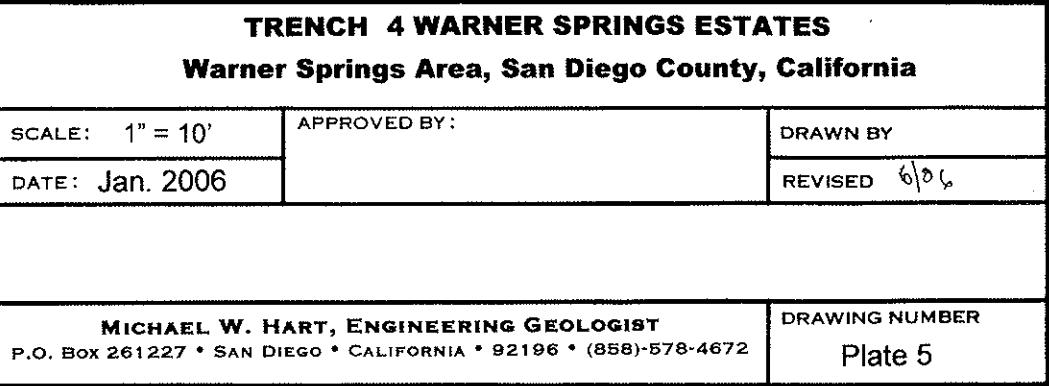
TRENCH 2 WARNER SPRINGS ESTATES
Warner Springs Area, San Diego County, California

SCALE: 1" = 10'	APPROVED BY:	DRAWN BY
DATE: Jan. 2006		REVISED 6/06
MICHAEL W. HART, ENGINEERING GEOLOGIST P.O. Box 261227 • SAN DIEGO • CALIFORNIA • 92196 • (858)-578-4672		DRAWING NUMBER Plate 3



LEGEND
 Topsoil
 A A-horizon; light to dark gray brown silty sand with leaf debris
 Qc Colluvium; loose, dry, light brown gritty silty sand
 Kgr Granitic rock; highly weathered, very coarse crystalline rock.
 Excavates with moderate difficulty to depth of 5 to 6 feet.
 fr = fracture ft = fault

TRENCH 3 WARNER SPRINGS ESTATES Warner Springs Area, San Diego County, California		
SCALE: 1" = 10'	APPROVED BY:	DRAWN BY
DATE: Jan. 2006		REVISED 6/06
MICHAEL W. HART, ENGINEERING GEOLOGIST P.O. Box 261227 • SAN DIEGO • CALIFORNIA • 92196 • (858)-578-4672		DRAWING NUMBER Plate 4

SE

MICHAEL W. HART
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June 26, 2006
File No. 691-2005

Warner Springs Estates, LLC
1037 Didrickson Way
Laguna Beach, California
92651

Attn: Mr. Bob Earl

Subject: The Highlands at Warner Springs
Warner Springs area,
San Diego County, California
(TM 5450)
(Addendum to Report of Geologic Investigation
dated January 23, 2006)

Dear Mr. Earl:

In accordance with the recommendations of the subject report and in response to the reviewing engineering geologist for the County of San Diego we are herewith submitting this addendum to our report of Geologic Investigation for the site. The intent of this addendum is two-fold; first, the original report dated January 23, 2006 indicated that additional trenching should be performed in the area of Trench 1 located in the central valley near the east property line. This additional work was completed as part of this addendum and consisted of extending Trench 1 to the south to completely traverse the prominent Central Valley lineament described in the January 23 report. The additional work was necessary because deep alluvium prevented completion of Trench 1 during the initial phase of work completed in January, 2006. The results of the additional trenching indicated that the Central Valley does not contain any additional faulting (see log of completed trench, Figure 8).

Secondly, we present the results of petrographic analyses of the fault zones that in the absence of more conventional methods of fault dating allows us to provide a relative age of latest faulting at the site.

In order to determine the degree of activity of the faults we consulted with Drs. Tom Rockwell and Gary Girty, two eminent research geologists to determine if there was a

method of dating faults where conventional methods utilizing radiocarbon dating and soil stratigraphic methods were not possible. It was determined that reopening the trenches to allow collection of fault gouge samples for microscopic analysis would be a viable method of determining if pedogenic clays (clays derived from weathering processes) displayed evidence of shearing. If they did not then this would provide good evidence that any faulting present would predate the weathering process and the faults could be judged not active during the Holocene (last 11,000 yrs). If the faults could be proven to have not been active during the Holocene epoch, then no setbacks for structures would be required.

Trenches 1 and 4 displaying the most significant fault features observed in the original investigation were reopened in May, 2006. Trench 1 was reopened from Station 30 to 50 and Station 70 to 90. Trench 4 was reopened between Stations 40 and 90. We observed the trench walls and collected samples of gouge for petrographic examination and dating purposes. The results of the analysis indicated that in the upper portions of trench exposures the poorly developed shears were completely obliterated by the presence of pedogenic clays. Further, we observed no microscopic shearing or alignment of mineral grains typical of Holocene faulting. It is concluded on this basis that that shearing predated the development of the clays and since timing of formation and illuviation of the clays occurred no later than latest Pleistocene, it allows us to conclude that the faults are not active.

Further, based on the evidence presented below it is concluded that all faulting on the site, including other relatively minor faults not examined petrographically are contemporaneous with intrusion of pegmatite dikes during emplacement of the early to mid-Cretaceous-aged batholithic rocks. It is also concluded the faults are not a constraint to development of the site and that structural setbacks are not required. Based on this work, we have determined that no additional trenching is required and that the minor faults encountered during the original investigation have not been active during the Holocene.

Field and Petrographic Analysis of Potential Shears Exposed in T1 and T4

Trench T-1

The main feature exposed in trench T-1 appears to be a weathered white leucocratic dike at Station 85 that may have sustained minor shear along its' margins, based on field observations (Figure 1). The similar but thicker dike observed at Station was also bordered by shears that were less prominent than at Station 85 and were not sampled. We could identify domains within the dike where alteration was considerably less, and where quartz and feldspar crystals could be easily discerned. In these cases, it was clear that little or so shear had occurred, at least in these portions of the dike. The fabric and mineralogy of the least weathered parts of the dike support our interpretation of its igneous origin.

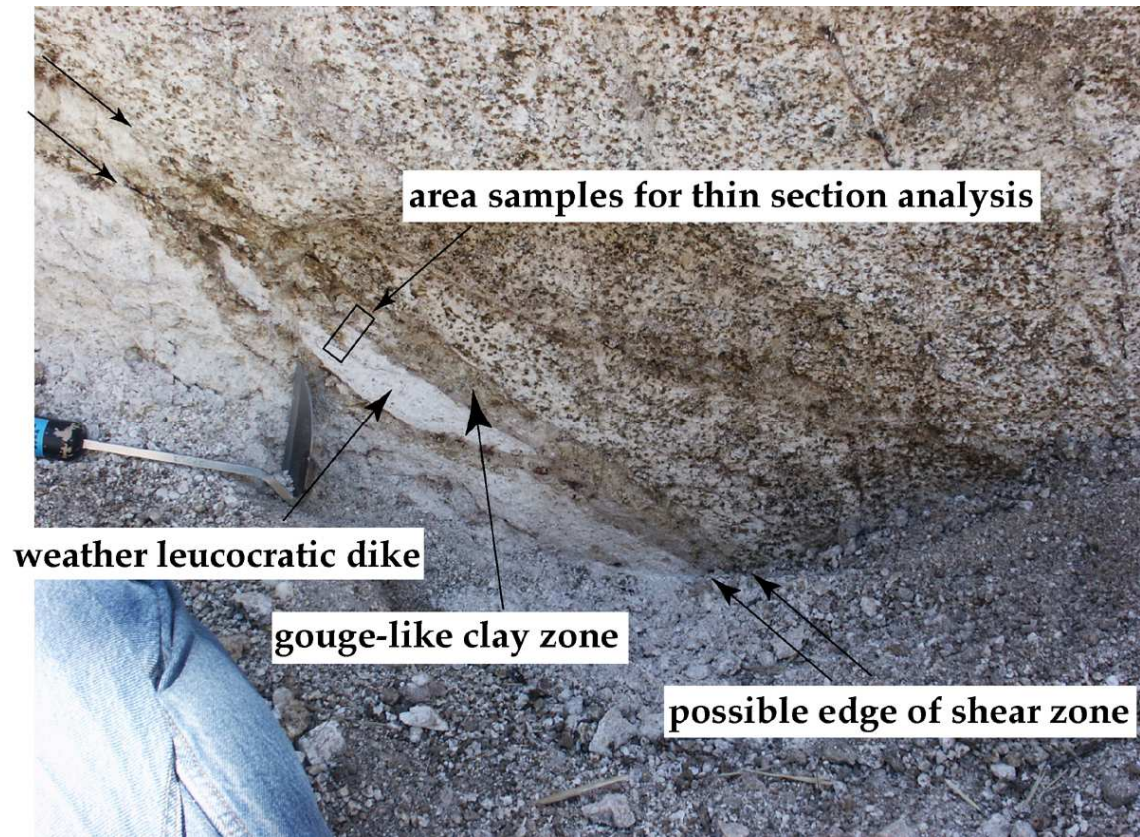


Figure 1. Annotated photograph of the dike and shear-like feature in trench T-1, location 85.

In the most intensely weathered portions, the original mineral and intrusive fabric is completely degraded, and is now expressed as a gouge-like tabular zone of clay. To test whether this zone has sustained shear, we collected samples through and across the tabular clay zone and its contact with the host granite. We then cut thin sections for petrographic analysis.

In the photomicrographs shown in Figure 2, taken from across the inferred shear contact, we observe abundant clay but no evidence of brittle shear. The clay appears to have been generated by in situ weathering, and fragmentation of grains through expansion and contraction of clay material. If recent shear had occurred, we would have expected alignment of clay particles and microscopic seams of angular, brittly-fragmented quartz and feldspar. None of those features are evident.

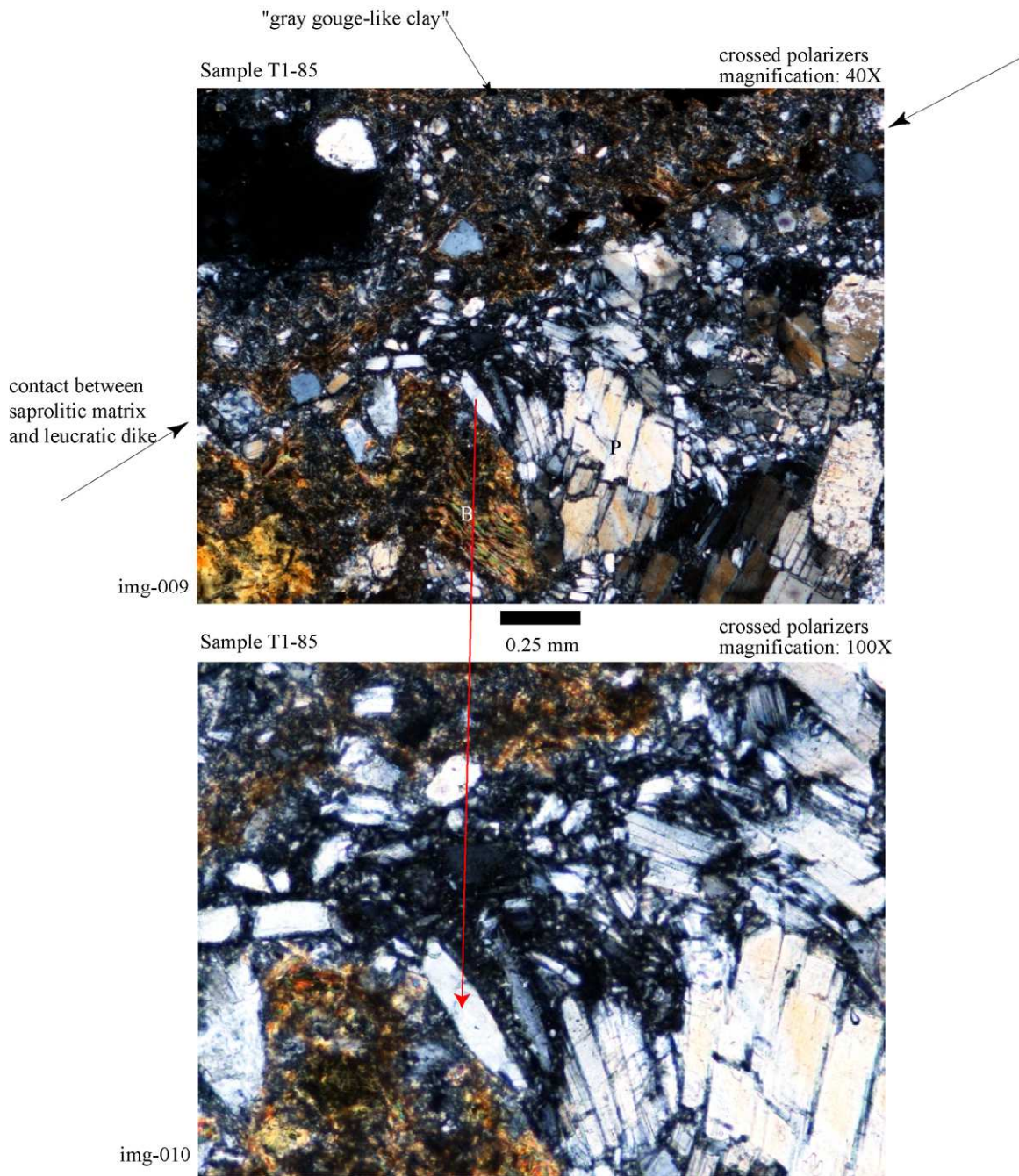


Figure 2. Photomicrograph of the sample collected across the possible shear exposed in T-1 at station 85.

Trench T-4

We studied two shear-like features in trench T-4, one at station 50 and one at station 85, both of which were parallel to the foliation in the foliated host granite. At station 50, the shear-like feature is bound at the base by a coarse-grained pegmatite dike with crystals up to 2 cm in dimension, which produces the main white band shown in figures 3 and 4. Above the pegmatite is a clay seam with crystals of quartz and feldspar. There are parting surfaces present, although

we could observe no striae or other evidence of shear on these surfaces. The clay seam is highly disrupted in the surface soil, but does not displace it. In fact, it appears that the landscape has been lowered across this feature, producing intense weathering of the dike core. The dike becomes fresher and less weathered with depth.



Figure 3. Possible shear exposed at station 85 in trench T-4. The white band is the coarse-grained dike which is locally quite weathered. The gray clay above the white zone is the possible shear.



Figure 4. Detail of the dike and gray clay at station 85. The dike is locally extensively weathered.

At station 85, a similar feature is exposed which is also bounded by a pegmatite at its base. The pegmatite measures 2-4 cm thick, with crystals up to 1 cm in size. Above this coarse-grained phase is much finer grained and highly weathered material, appearing similar to the clay seam at station 85. We could discern no evidence of shear, although there are parting surfaces lined with pedogenic clay. Much of the dike appears weathered to kaolinite, with residual quartz crystals.

Again, there are two issues here. Could the dike have sustained some relative motion (minor faulting) and, if so, is it potentially active. Two observations clearly bear on this matter. First, the dike is itself offset by a few cm across a joint (Figure 5) near the base of the trench, indicating that if minor motion had been sustained along the dike, then it must have occurred prior to regional uplift and the formation and minor motion on the joint surface (this is common in the Peninsular Ranges). Further, the dike itself is much less weathered at the base of the trench at station 50 and loses its fault-like appearance with depth (Figure 5).



Figure 5. Pegmatite dike and overlying gray clay exposed in trench T-4, offset by minor motion along a joint. Minor differential motion on joints is common in the Peninsular Ranges and is presumed to have occurred during regional uplift during the late Cretaceous.

To test this further, we collected samples for thin-section analysis from both features in trench T-4 to resolve whether there is evidence of shear at the microscopic level. Figure 6 is a photomicrograph of the weathered dike at station 85 in trench T-4. The gouge-like material is in situ weathered clay and there is no expression of brittle shear. One grain (outlined in red) appears offset, but cannot be displaced more than a half millimeter. In contrast, there is abundant evidence of in situ fragmentation and weathering with no observable displacement.

Figure 7 is a photomicrograph taken from the same sample as that in figure 6, but across the possible gouge and shear zone. In this image, there is abundant clay with no preferred orientation that would be indicative of shear. In contrast, there are abundant grain fragments and ghosts of plagioclase that clearly have not been sheared or granulated but display a high degree of weathering. Again, there is no evidence of shear expressed across the clay seam, either at the macroscopic or microscopic level.

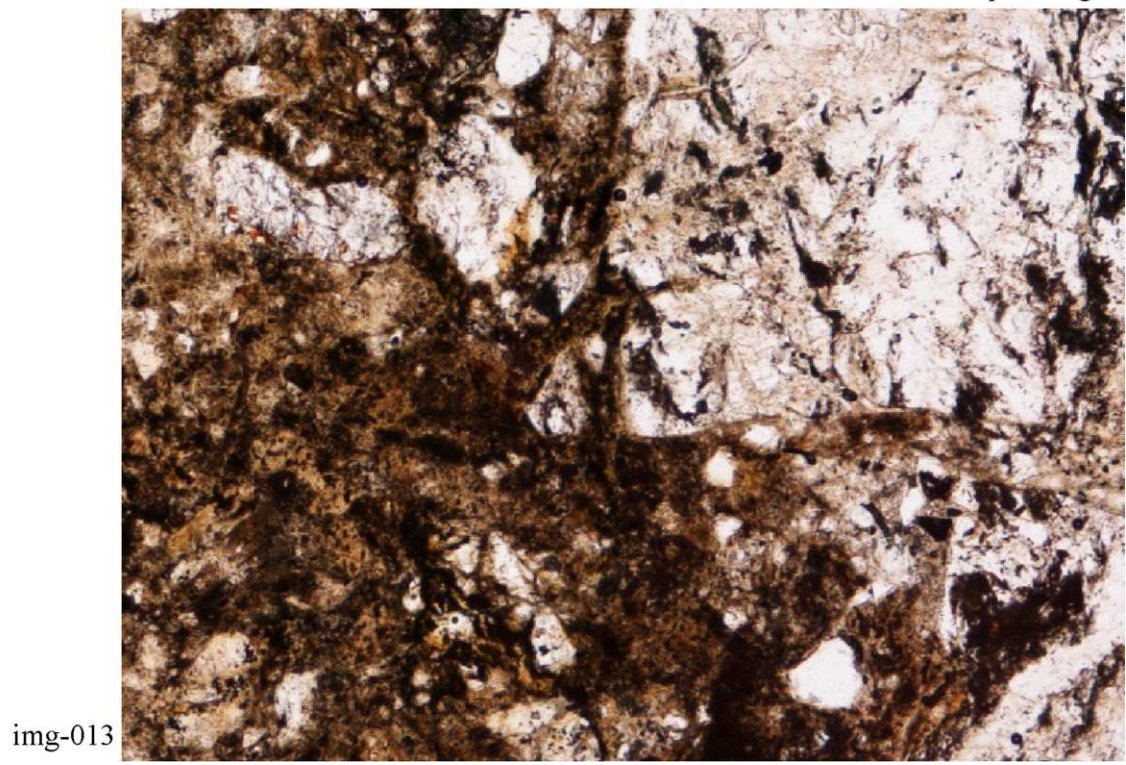
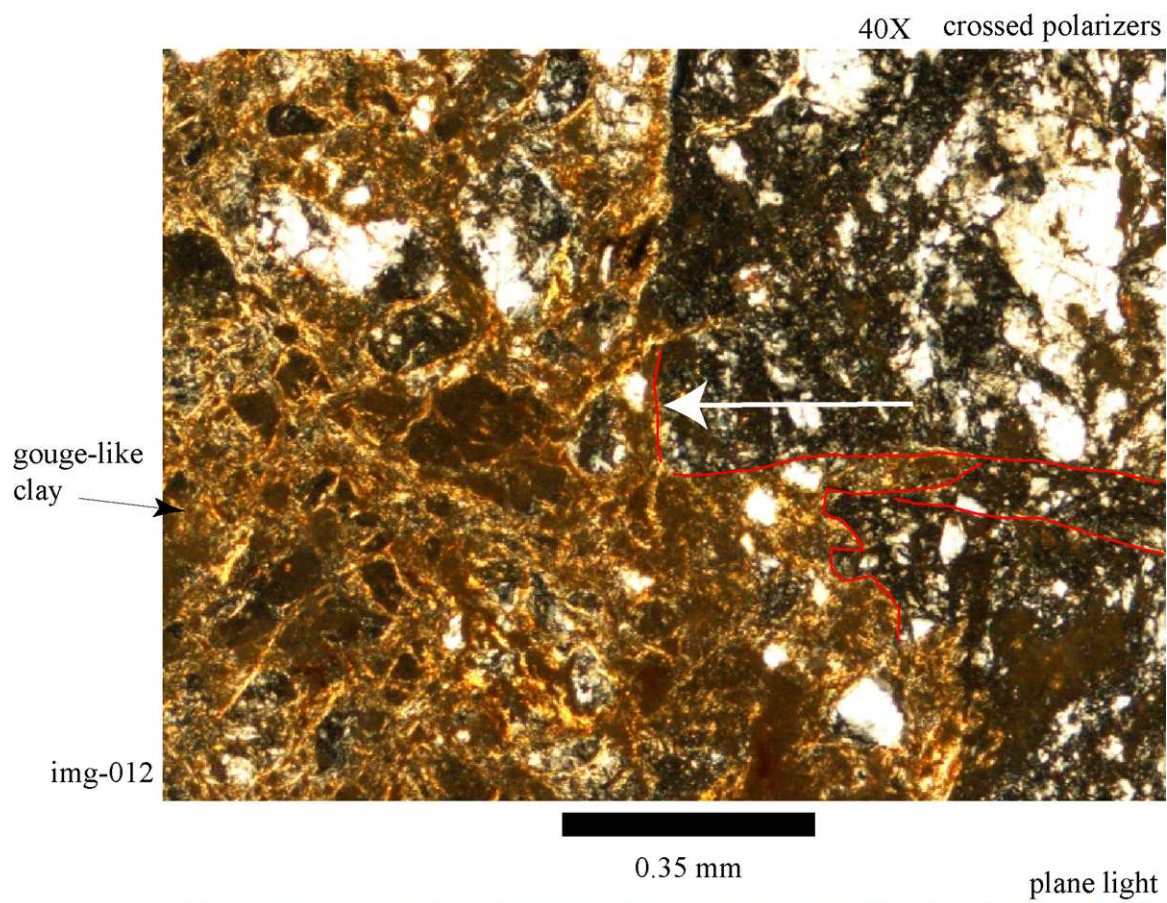
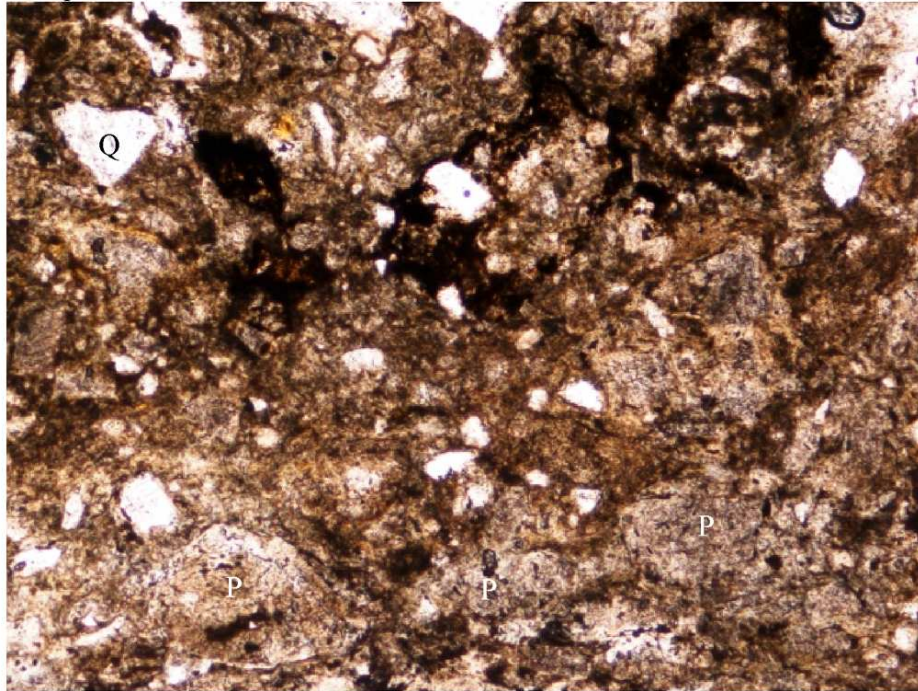


Figure 6. Photomicrograph of the weathered pegmatite dike material.

Sample: T4-85-1

plane light
magnification: 40X

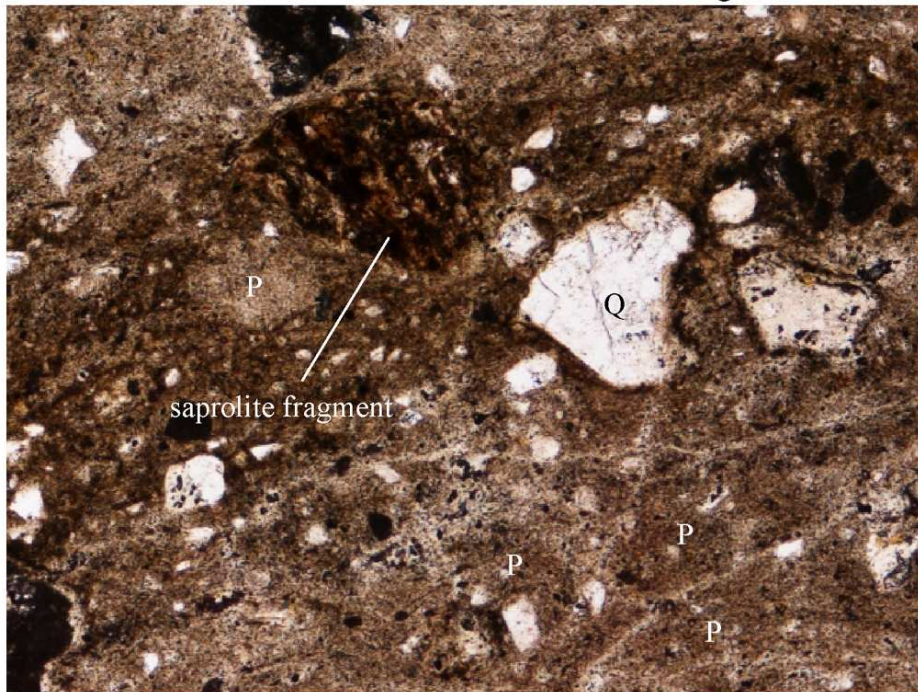


img-007

Sample: T4-85-1

0.25 mm

plane light
magnification: 40X



img-008

0.25 mm

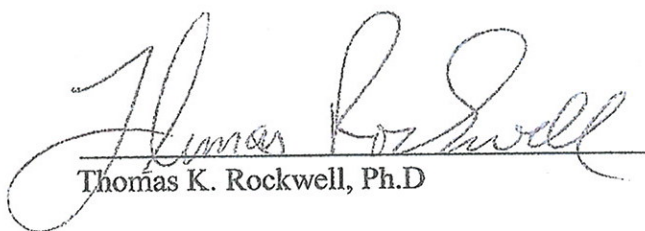
Figure 7. Photomicrograph of the possible gouge at station 85 in trench T-4. Note the absence of shear, in spite of the abundant clay.

In conclusion, we see no evidence of significant brittle shear in any samples from trenches T-1 or T-4, either at the macroscopic or microscopic level. In contrast, there is abundant evidence of localized accumulations of pedogenic clay concentrated along some parting surfaces and in situ fragmentation likely brought on by expansion and contraction of pedogenic clays. In short, we interpret these features as highly weathered dikes that locally have the appearance of shears due to intense weathering and in situ clay production.

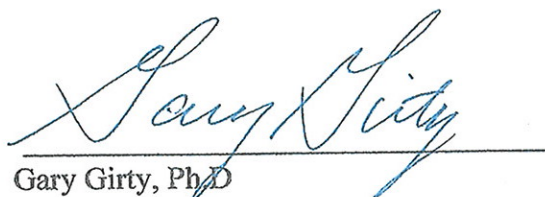
Respectfully submitted,



Michael W. Hart
Engineering Geologist, CEG 706



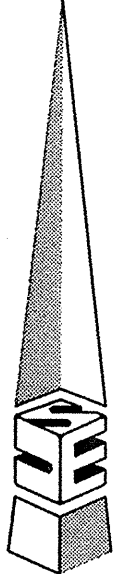
Thomas K. Rockwell, Ph.D



Gary Girty, Ph.D

**FAULT MAP AND SITE PLAN
THE HIGHLANDS AT WARNER
SPRINGS
San Diego County California**

PLATE 1



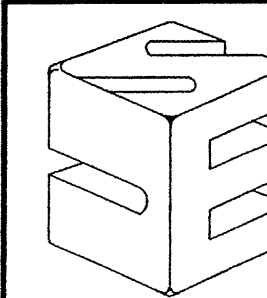
SCALE 1" = 200'



LEGEND
Exploratory Trench location
F-1 Fault location (see text)

SITE LAYOUT

DATE: 6/28/06



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